CLAIMS:

1. A frequency determining system comprising:

a signal generator operable, when energised by an alternating excitation signal, to generate an alternating response signal of predetermined but unknown frequency and whose amplitude varies in dependence upon the difference in frequency between the excitation signal and the response signal;

an energising circuit operable to generate first and second excitation signals at first and second different excitation frequencies for energising said signal generator;

a receiver operable to receive a first response signal generated by said signal generator when energised by said first excitation signal and a second response signal generated by said signal generator when energised by said second excitation signal;

a processing circuit operable to process each of the first and second response signals received by said receiver to generate first and second amplitude measures indicative of the amplitudes of the corresponding response signals; and

a determining circuit operable to determine a frequency measure indicative of the frequency of the alternating response signals generated by said signal generator using said first and second amplitude measures.

2. A system according to claim 1, wherein said processing circuit comprises:

a mixing circuit operable to mix the first response signal with first and second mixing signals to provide first and second mixed signals and operable to mix the second response signal with third and fourth mixing signals to provide third and fourth mixed signals; and

a combining circuit operable to combine the first and second mixed signals to provide said first amplitude measure and operable to combine the third and fourth mixed signals to provide said second amplitude measure.

3. A system according to claim 2, wherein said signal generator is a first signal generator and further comprising a second signal generator operable to generate said first, second, third and fourth mixing signals.

4. A system according to claim 3, wherein said second signal generator is operable to generate said mixing signals so that said first and second mixing signals are in phase quadrature and so that the said third and fourth mixing signals are in phase quadrature.

5. A system according to claim 4, wherein said second signal generator is operable to generate said first and second mixing signals at a frequency corresponding to said first excitation frequency and is operable to generate said third and fourth mixing signals at a frequency corresponding to said second excitation frequency.

6. A system according to claim 5, wherein said processing circuit is operable to process at least said first and second mixed signals to determine a phase measure which varies with the difference in frequency between the mixing signals and the respective response signal and wherein said determining circuit is operable to determine said frequency measure in dependence upon said amplitude measure and said phase measure.

7. A system according to claim 6, wherein said phase measure cyclically varies with the difference in

frequency between the frequency of the alternating response signal and the corresponding mixing signals and wherein said determining circuit is operable to use said first and second amplitude measures to resolve the cyclic ambiguity associated with said phase measure.

8. A system according to any of claims 2 to 7, wherein said combining circuit is operable to combine said first and second mixed signals by taking the sum of the squares of the first and second mixed signals, to provide said first amplitude measure.

9. A system according to any of claims 2 to 8, wherein said combining circuit is operable to combine said third and fourth mixed signals by taking the sum of the squares of the third and fourth mixed signals, to provide said second amplitude measure.

10. A system according to any preceding claim, wherein said determining circuit is operable to determine an amplitude ratio by taking the ratio of the first and second amplitude measures and is operable to determine said frequency measure using said amplitude ratio.

11. A system according to claim 10, wherein said determining circuit is operable to determine said frequency measure in dependence upon a result of a non-linear function of said amplitude ratio.

12. A system according to claim 11, wherein said determining circuit is operable to determine said frequency measure in dependence upon a result of a logarithmic function of said amplitude ratio.

13. A system according to claim 11, wherein said

determining circuit is operable to determine said frequency measure in dependence upon a result of an arc tangent function of said amplitude ratio

14. A system according to any of claims 11 to 13, wherein said determining circuit is operable to determine said frequency measure by applying the result of said non-linear function to a predetermined linear transformation.

15. A system according to claim 14, wherein said determining circuit is programmable so that said predetermined linear transformation can be varied.

16. A system according to any of claims 11 to 15, wherein said determining circuit is programmable so that said non-linear function can be varied.

17. A system according to any preceding claim, wherein said energising circuit is operable to generate first and second electromagnetic signals at said first and second different excitation frequencies for energising said signal generator.

18. A system according to any preceding claim, wherein said signal generator is operable to generate alternating electromagnetic response signals when energised by said excitation signal.

19. A system according to any preceding claim, wherein said signal generator comprises a resonator.

20. A system according to claim 19, wherein said resonator is an electromagnetic resonant circuit.

21. A system according to claim 20, wherein said electromagnetic resonant circuit comprises a coil and a capacitor.

22. A system according to any preceding claim, wherein said signal generator is passive.

23. A system according to any preceding claim, wherein said signal generator is provided separate from but is electromagnetically coupled to said receiver.

24. A system according to claim 23, wherein said signal generator and said receiver are relatively movable.

25. A system according to claim 24, further comprising position processing circuitry operable to process at least one of said first and second response signals to determine the relative position between said signal generator and said receiver.

26. A system according to any preceding claim, wherein said signal generator is operable to vary the frequency of said response signal in dependence upon the value of a variable and wherein said determining circuit is operable to determine the value of said variable from the determined frequency measure.

27. A system according to claim 26, wherein said signal generator comprises an electrically resonant circuit and a component for varying the inductance, capacitance or resistance of the resonant circuit.

28. A system according to claim 27, wherein said component comprises a ferrite element which is displaceable relative to an inductance coil of said

resonant circuit and wherein the position of said ferrite element relative to said coil is moved in dependence upon the value of said variable in order to vary the inductance of said coil and hence the resonant frequency of said resonant circuit.

29. A system according to any preceding claim, wherein said energising circuit is operable to generate said first excitation signal during a first time interval and is operable to generate said second excitation signal during a second time interval after said first time interval.

30. A system according to claim 29, wherein said processing circuit is operable to process the first response signal during a third time interval between said first and second time intervals and is operable to process said second response signal during a fourth time interval after said second time interval.

31. A system according to any preceding claim, wherein said energising circuit is operable to generate three or more excitation signals at respective different excitation frequencies, wherein said receiver is operable to receive three or more response signals generated by said signal generator when energised by the respective three or more excitation signals, wherein said processing circuit is operable to process said three or more response signals to generate three or more amplitude measures indicative of the amplitudes of the corresponding response signals; and wherein said determining circuit is operable to determine said frequency measure using said three or more amplitude measures.

32. A system according to claim 31, wherein said processing circuit is operable to process the first, second and third response signals to generate first, second and third processed signals respectively, wherein said processing circuit comprises a combining circuit operable to combine the first and second processed signals to remove a common offset from the first and second processed signals to provide a first combined signal and to combine the second and third processed signals to remove a common offset from the second and third processed signals and to provide a second combined signal, and wherein said processing circuit is operable to determine said first and second amplitude measures using said first and second combined signals.

33. An apparatus comprising:

a receiver operable to receive a first response signal generated by a signal generator when energised by a first excitation signal having a first excitation frequency, and a second response signal generated by said signal generator when energised by a second excitation signal having a second different excitation frequency;

a processing circuit operable to process each of the first and second response signals received by said receiver to generate first and second amplitude measures indicative of the amplitude of the corresponding response signals; and

a determining circuit operable to determine a frequency measure indicative of the frequency of the alternating response signals generated by said signal generator using said first and second amplitude measures.

34. An apparatus according to claim 33, further comprising an energising circuit operable to generate said first and second excitation signals at said first

and second different excitation frequencies for energising said signal generator.

35. An apparatus according to claim 33 or 34, wherein said processing circuit comprises:

a mixing circuit operable to mix the first response signal with first and second mixing signals to provide first and second mixed signals and operable to mix the second response signal with third and fourth mixing signals to provide third and fourth mixed signals; and

a combining circuit operable to combine the first and second mixed signals to provide said first amplitude measure and operable to combine the third and fourth mixed signals to provide said second amplitude measure.

36. An apparatus according to claim 35, further comprising a second signal generator operable to generate said first, second, third and fourth mixing signals.

37. An apparatus according to claim 36, wherein said signal generator is operable to generate said mixing signals so that said first and second mixing signals are in phase quadrature and so that the said third and fourth mixing signals are in phase quadrature.

38. An apparatus according to claim 37, wherein said signal generator is operable to generate said first and second mixing signals at a frequency corresponding to said first excitation frequency and is operable to generate said third and fourth mixing signals at a frequency corresponding to said second excitation frequency.

39. An apparatus according to claim 38, wherein said processing circuit is operable to process at least said

first and second mixed signals to determine a phase measure which varies with the difference in frequency between the mixing signals and the respective response signal and wherein said determining circuit is operable to determine said frequency measure in dependence upon said amplitude measure and said phase measure.

40. An apparatus according to claim 39, wherein said phase measure cyclically varies with the difference in frequency between the frequency of the alternating response signal and the corresponding mixing signals and wherein said determining circuit is operable to use said first and second amplitude measures to resolve the cyclic ambiguity associated with said phase measure.

41. An apparatus according to any of claims 35 to 40, wherein said combining circuit is operable to combine said first and second mixed signals by taking the sum of the squares of the first and second mixed signals, to provide said first amplitude measure.

42. An apparatus according to any of claims 35 to 41, wherein said combining circuit is operable to combine said third and fourth mixed signals by taking the sum of the squares of the third and fourth mixed signals, to provide said second amplitude measure.

43. An apparatus according to any of claims 34 to 42, wherein said determining circuit is operable to determine an amplitude ratio by taking the ratio of the first and second amplitude measures and is operable to determine said frequency measure using said amplitude ratio.

44. An apparatus according to claim 43 wherein said determining circuit is operable to determine said

frequency measure in dependence upon a result of a non-linear function of said amplitude ratio.

45. An apparatus according to claim 44, wherein said determining circuit is operable to determine said frequency measure in dependence upon a result of a logarithmic function of said amplitude ratio.

46. An apparatus according to claim 44, wherein said determining circuit is operable to determine said frequency measure in dependence upon a result of an arc tangent function of said amplitude ratio

47. An apparatus according to any of claims 44 to 46, wherein said determining circuit is operable to determine said frequency measure by applying the result of said non-linear function to a predetermined linear transformation.

48. An apparatus according to claim 33 or 34, wherein said receiver is formed by an input terminal of a processing unit.

49. An apparatus according to claim 48, wherein said processing unit is formed by an integrated circuit.

50. A system according to claim 35, wherein said energising circuit is operable to generate first and second electromagnetic signals at said first and second different excitation frequencies for energising said signal generator.

51. An apparatus according to any of claims 34 to 50, wherein said signal generator and said receiver are relatively movable and further comprising position

processing circuitry operable to process at least one of said first and second response signals to determine the relative position between said signal generator and said receiver.

52. An apparatus according to any of claims 33 to 51, wherein said signal generator is operable to vary the frequency of said response signal in dependence upon the value of a variable and wherein said determining circuit is operable to determine the value of said variable from the determined frequency measure.

53. An apparatus according to claim 34, wherein said energising circuit is operable to generate said first excitation signal during a first time interval and is operable to generate said second excitation signal during a second time interval after said first time interval.

54. A system according to claim 53, wherein said processing circuit is operable to process the first response signal during a third time interval between said first and second time intervals and is operable to process said second response signal during a fourth time interval after said second time interval.

55. An apparatus according to any preceding claim, wherein said receiver is operable to receive three or more response signals generated by said signal generator when energised by three or more excitation signals, wherein said processing circuit is operable to process said three or more response signals to generate three or more amplitude measures indicative of the amplitudes of the corresponding response signals; and wherein said determining circuit is operable to determine said

frequency measure using said three or more amplitude measures.

56. An apparatus according to claim 55, wherein said processing circuit is operable to process the first, second and third response signals to generate first, second and third processed signals respectively, wherein said processing circuit comprises a combining circuit operable to combine the first and second processed signals to remove a common offset from the first and second processed signals to provide a first combined signal and to combine the second and third processed signals to remove a common offet from the second and third processed signals and to provide a second combined signal, and wherein said processing circuit is operable to determine said first and second amplitude measures using said first and second combined signals.

57. A positioning system comprising first and second relatively moveable members,

the first member comprising a signal generator operable, when energised by an alternating excitation signal, to generate an alternating response signal of predetermined but unknown frequency and whose amplitude varies in dependence upon the difference in frequency between the excitation signal and the response signal; and

the second member comprising:

an energising circuit operable to generate first and second excitation signals at first and second different excitation frequencies for energising said signal generator;

a receiver operable to receive a first response signal generated by said signal generator when energised by said first excitation signal and a second response

signal generated by said signal generator when energised by said second excitation signal;

a processing circuit operable to process each of the first and second response signals received by said receiver to generate first and second amplitude measures indicative of the amplitudes of the corresponding response signals;

a determining circuit operable to determine a frequency measure indicative of the frequency of the alternating response signals generated by said signal generator using said first and second amplitude measures; and

a positioning circuit operable to process at least one of the first and second response signals to determine the relative position between the first and second members.

58. A positioning system according to claim 57, wherein said signal generator is operable to vary the frequency of said response signal in dependence upon a status of the first member and wherein said second member further comprises a second determining circuit operable to determine the status of said first member using the determined frequency measure.

59. A positioning system according to claim 58, wherein said first member comprises a position pointer, wherein said second member comprises an x-y digitising tablet and wherein said signal generator is operable to vary the frequency of said response signal when the position pointer is brought into contact with an x-y digitising surface of said tablet.

60. A positioning system according to any of claims 57 to 59, further comprising any one or more of the system

features claimed in any of claims 2 to 31.

61. A positioning system for determining the status of a position indicator which generates an alternating signal of a predetermined but unknown frequency, the positioning system comprising:

a receiver operable to receive an alternating signal which varies with the alternating signal generated by said position indicator;

a signal generator operable to generate first and second alternating signals having a first frequency and different phases and for generating third and fourth alternating signals having a second different frequency and different phases;

a mixing circuit operable to mix the received signal with each of the generated first, second, third and fourth signals to provide first, second, third and fourth mixed signals respectively;

a combining circuit operable to combine the first and second mixed signals to provide a first amplitude measure and operable to combine the third and fourth mixed signals to provide a second amplitude measure;

a first determining circuit operable to determine a frequency measure indicative of the frequency of the signal generated by said position indicator using said first and second amplitude measures; and

a second determining circuit operable to determine the status of said position indicator using the determined frequency measure.

62. A system for determining the value of a variable, the system comprising:

a signal generator operable to generate first and second alternating mixing signals;

a mixing circuit operable to mix an alternating

received signal, whose frequency varies with the value of said variable, with said first and second mixing signals to generate first and second mixed signals respectively;

a processing circuit operable to process said first and second mixed signals to generate first and second phase measures which vary with the frequency of said received signal;

wherein one or more of said signal generator, said mixing circuit and said processing circuit are arranged so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal;

a combining circuit operable to combine the first and second phase measures to determine a combined phase measure which varies with the frequency of the received signal; and

a determining unit operable to determine the value of said variable using said combined phase measure.

63. A system according to claim 62, wherein said mixing circuit is operable to mix said received signal with said first and second mixing signals so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

64. A system according to claim 62 or 63, wherein said mixing circuit is operable to mix said alternating received signal with said first and second mixing signals for different durations so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

65. A system according to claim 62 or 63, wherein said received signal is received during a predetermined receive period and wherein said mixing circuit is operable to mix said receive signal with said first and second mixing signals at different times within said receive period, so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

66. A system according to claim 65, wherein said mixing circuit is operable to mix said receive signal with said first and second mixing signals during overlapping mixing periods.

67. A system according to any of claims 62 to 66, wherein said signal generator is operable to generate said first and second alternating mixing signals at different frequencies so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

68. A system according to any of claims 62 to 67, wherein said processing circuit includes a variable gain circuit which is operable to apply different gains to said first and second mixed signals so that the first phase measure varies with the frequency of said received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

69. A system according to any of claims 62 to 68, wherein said processing circuit includes an integrator for integrating said first and second mixed signals and

wherein said processing circuit is operable to vary the integrating period for integrating the first and second mixed signals so that the first phase measure varies with the frequency of the received signal in a different way to the way in which the second phase measure varies with the frequency of the received signal.

70. A system according to any of claims 62 to 69, wherein said signal generator is operable to generate first, second, third and fourth alternating mixing signals, wherein said mixing circuit is operable to mix said receive signal with said first, second, third and fourth mixing signals to generate first, second, third and fourth mixed signals respectively, wherein said processing circuit is operable to combine the first and third mixed signals to provide said first phase measure and is operable to combine the second and fourth mixed signals to provide said second phase measure.

71. A system according to claim 70, wherein said signal generator is arranged to generate said mixing signals so that said first and third mixing signals have the same frequency but different phases and so that said second and fourth mixing signals have the same frequency but different phases.

72. A system according to claim 71, wherein said signal generator is arranged so that said first and third mixing signals are in phase quadrature and said second and fourth mixing signals are in phase quadrature.

73. A system according to claim 72, wherein said processing circuit is operable to determine said first phase measure using a ratio-metric arc tangent calculation on said first and third mixed signals.

74. A system according to claim 72 or 73, wherein said processing circuit is operable to generate said second phase measure by taking a ratio-metric arc tangent function of said second and fourth mixed signals.

75. A system according to any of claims 62 to 74, wherein said combining circuit is operable to determine said combined phase measure by subtracting the first phase measure from the second phase measure.

76. A system according to claim 75, wherein said combining circuit is operable to combine the first and second phase measures in accordance with the following equation:

$$P_e(B-A) = P_e(B) - P_e(A) + \pi\left[\left(1\,\mathrm{If}\{P_e(B) - P_e(A)\} < \frac{-\pi}{2}\,\mathrm{else}\,0\right) - \left(1\,\mathrm{If}\{P_e(B) - P_e(A)\} \geq \frac{\pi}{2}\,\mathrm{else}\,0\right)\right]$$

where $P_e(A)$ is the first phase measure and $P_e(B)$ is the second phase measure.

77. A system according to any of claims 62 to 76, wherein said determining unit is operable to determine the value of said variable by applying said combined phase measure to a predetermined transformation function.

78. A system according to claim 77, wherein said predetermined transformation function is a linear transformation function.

79. A system according to any of claims 62 to 78, wherein said determining unit is operable to determine the value of said variable using said combined phase measure and said first phase measure.

80. A system according to claim 79, wherein said first

phase measure cyclically varies with the value of said variable and wherein said determining unit is operable to resolve a cyclic ambiguity associated with the first phase measure using said combined phase measure.

81. A system according to any of claims 62 to 80, wherein said mixing circuit is operable to mix different receive signals with said first and second mixing signals to generate said first and second mixed signals.

82. A system according to any of claims 62 to 81, comprising a receiver for receiving said receive signal.

83. A system according to any of claims 62 to 82, further comprising a second signal generator operable to generate a signal whose frequency varies with the value of said variable.

84. A system according to claim 83, wherein said second signal generator is operable to generate said signal when energised by an alternating excitation signal.

85. A system according to claim 84, wherein said second signal generator is operable to generate an alternating electromagnetic signal when energised by said excitation signal.

86. A system according to claim 84 or 85, wherein said second signal generator comprises a resontator.

87. A system according to claim 86, wherein said resonator is an electromagnetic resonant circuit.

88. A system according to any of claims 83 to 87, wherein said second signal generator is passive.

89. A system according to any of claims 86 to 88, wherein said second signal generator is arranged so that the resonant frequency of said resonator varies with the value of said variable.

90. A positioning system for determining the status of a position indicator having a resonator which generates, when energised, a resonator signal at a resonator frequency, the positioning system comprising:

an energising circuit operable to transmit an energising signal for energising said resonator;

a receive circuit operable to sense the resonator signal generated by said resonator when energised and operable to output an alternating receive signal, at said resonator frequency, which varies with the status of said position indicator; and

a processing circuit for processing said receive signal to determine an estimate of said resonator frequency and to determine the status of said position indicator;

wherein said positioning system comprises:

an acquisition mode of operation in which:

i) said energising circuit is operable to transmit plural energising signals at respective different energising frequencies;

ii) said receive circuit is operable to sense the resonator signal generated by said resonator when energised by each of said energising signals and to output a respective plurality of receive signals; and in which

iii) said processing circuit is operable to determine an estimate of said resonator frequency from said plurality of receive signals; and

a tracking mode in which:

i) said energising circuit is operable to

transmit an energising signal having a frequency corresponding to the current estimate of the resonator frequency; and in which

ii) said processing circuit is operable to process the receive signal output by said receive circuit to track changes in the resonator frequency of said resonator signal and to update the current estimate of the resonator frequency.

91. A system according to claim 90, wherein in said acquisition mode, said processing circuit is operable to process the plurality of receive signals to determine a corresponding plurality of amplitude measures indicative of the amplitudes of the plurality of receive signals and is operable to estimate the resonator frequency from said plurality of amplitude measures.

92. A system according to claim 91, wherein in said acquisition mode, said energising circuit is operable to transmit two energising signals at respective different energising frequencies.

93. A system according to claim 92, wherein in said acquisition mode, said processing circuit is operable to combine the two amplitude measures and to determine said estimate of the resonator frequency from the combined amplitude measures.

94. A system according to claim 91, wherein in said acquisition mode, said energising circuit is operable to transmit three energising signals at respective different energising frequencies, wherein said processing circuit is operable to process a first, second and third receive signal generated in response to said three energising signals, to generate first, second and third processed

signals respectively, wherein said processing circuit comprises a combining circuit operable to combine the first and second processed signals to remove a common offset from the first and second processed signals to provide a first combined signal and to combined the second and third processed signals to remove a common offset from the second and third processed signals to provide a second combined signal, wherein said processing circuit is operable to determine first and second amplitude measures using said first and second combined signals, and wherein said processing circuit is operable to determine said estimate of the resonator frequency from said first and second amplitude measures.

95. A system according to any of claims 91 to 94, wherein in said acquisition mode, said processing circuit comprises a mixing circuit operable to mix each receive signal with first and second mixing signals to provide first and second mixed signals and a combining circuit operable to combine the first and second mixed signals for each received signal, to provide said amplitude measure for each receive signal and is operable to determine said estimate of the resonator frequency from said amplitude measures.

96. A system according to claim 95, wherein said mixing circuit is operable to mix each receive signal with mixing signals which are in phase quadrature.

97. A system according to any of claims 91 to 96, wherein in said acquisition mode, said processing circuit is operable to determine one or more amplitude ratios by taking the ratio of said plurality of amplitude measures and is operable to determine the estimate of said resonator frequency using said one or more amplitude

ratios.

98. A system according to claim 97, wherein said processing circuit is operable to determine said estimate of the resonator frequency in dependence upon a result of a non-linear function of said amplitude ratio.

99. A system according to claim 98, wherein said processing circuit is operable to determine said estimate of the resonator frequency by applying the result of said non-linear function to a predetermined linear transformation.

100. A system according to any of claims 90 to 99, further comprising a standby mode of operation in which said energising circuit is operable to transmit an energising signal for energising said resonator, wherein said receive circuit is operable to sense a resonator signal generated by said resonator when energised by said energising signal and to output a receive signal; and in which said processing circuit is operable to compare said receive signal with previous receive signals to determine if said position indicator is present.

101. A system according to claim 100, operable to remain in said standby mode of operation until said processing circuit detects the presence of said position indicator.

102. A system according to claim 100 or 101, wherein said positioning system is operable to change from said standby mode of operation to said acquisition mode of operation when said processing circuit detects the presence of said position indicator.

103. A system according to any of claims 100 to 102,

wherein during both said standby mode of operation and said acquisition mode of operation, said energising circuit and said receive circuit operate cyclically over a number of excitation and detection sequences and wherein the time between successive excitation and detection sequences in the standby mode is greater than the time between successive excitation and detection sequences in the acquisition mode.

104. A system according to claim 103, wherein said energising circuit and said receive circuit operate, during said tracking mode, in a cyclic manner over a number of excitation and detection sequences and wherein the time between successive excitation and detection sequences in said acquisition mode is greater than the time between successive excitation and detection sequences in said tracking mode.

105. A system according to any of claims 90 to 104, wherein said energising circuit is operable to generate an energising signal during a first time interval and wherein said processing circuit is operable to process said receive signal during a second time interval after said first time interval.

106. A system according to any of claims 90 to 105, wherein during said tracking mode of operation, said processing circuit is operable to mix said receive signal with an alternating mixing signal to generate a mixed signal and wherein said processing circuit is operable to determine a phase measure which varies with the difference in frequency between the mixing signal and the receive signal and is operable to update said current estimate of the resonator frequency using said phase measure.

107. A system according to claim 106, wherein during said tracking mode, said processing circuit is operable to mix said receive signal with first and second mixing signals to generate first and second mixed signals respectively, wherein said processing circuit is operable to process said first and second mixed signals to generate first and second phase measures which vary with the difference in frequency between the respective mixing signal and the frequency of the receive signal, wherein the processing circuit is operable to combine the first and second phase measures to determine a combined phase measure which varies with the frequency of the receive signal and is operable to update the current estimate of the resonator frequency using said combined phase measure.

108. A system according to claim 107, wherein during said tracking mode of operation, at least one or more of said energising circuit and said processing circuit are arranged so that said first phase measure varies with the frequency of the receive signal in a different way to the way in which the second phase measure varies with the frequency of the receive signal.

109. A system according to claim 108, wherein said processing circuit is operable to mix said receive signal with said first and second mixing signals with different durations so that the first phase measure varies with the frequency of the receive signal in a different way to the way in which the second phase measure varies with the frequency of the receive signal.

110. A system according to claim 108 or 109, wherein said receive signal is received during a predetermined receive period and wherein said processing circuit is operable to process the receive signal with said first and second

mixing signals at different times within said receive period, so that the first phase measure varies with the frequency of the receive signal in a different way to the way in which the second phase measure varies with the frequency of the receive signal.

111. A system according to any of claims 108 to 110, wherein said processing circuit is operable to mix said receive signal with first and second mixing signals having different frequencies, so that the first phase measure varies with the frequency of said receive signal in a different way in which the second phase measure varies with the frequency of the receive signal.

112. A system according to any of claims 108 to 111, wherein said processing circuit includes an integrator for integrating said first and second mixed signals and is operable to vary the integrating period for integrating the first and second mixed signals, so that the first phase measure varies with the frequency of the receive signal in a different way to the way in which the second phase measure varies with the frequency of the receive signal.

113. A system according to any of claims 90 to 112, wherein said positioning system is arranged to remain in said tracking mode of operation until the signal level of the receive signal falls below a predetermined threshold.

114. A system according to any of claims 90 to 113, wherein said receive signal varies with the relative position between said position indicator and said receive circuit and wherein said processing circuit is operable to process said receive signal to determine the relative

position between the position indicator and the received circuit.

115. A system according to any of claims 90 to 114, wherein said position indicator has a clicked state and an unclicked state, wherein the resonant frequency of the resonator is different between said clicked state and said unclicked state, and wherein said processing circuit is operable to determine whether or not the position indicator is in said clicked state or said unclicked state, from the determined estimate of the resonator frequency.

116. A system according to claim 115, wherein said processing circuit is operable to process said receive signal to determine the relative position between said position indicator and said receive circuit, and wherein said processing circuit is operable to update a current position measure if said position indicator is in said clicked state and not if said position indicator is in said unclicked state.